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Journal of the Society of Arts.

FRIDAY, MAY 24, 1861.

INTERNATIONAL EXHIBITION OF
1862.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £400,000, have been attached to the Deed.

The following is a list of those who have signed the Guarantee Deed, with the amounts guaranteed. Those marked with an asterisk are members of the Society of Arts:—

*H.R.H. The Prince Consort	£10,000
*Abel, Frederick Augustus, F.R.S.	100
*Acland, Sir Thomas Dyke, Bart.	200
*Acland, Henry W., M.D., F.R.S.	100
*Adam, James Skipper	200
Adams, William Salkeld (W. S. Adams & Son)	100
Agnew, Thomas	100
Agnew, Thos. Jun.	100
Agnew, William	100
Ainsworth, Thos.	500
*Akroyd, Edward (Jas. Akroyd and Son)	500
*Aldam, William	100
Alexander, James	500
*Alexander, Henry Browne	100
*Aley, Frederick William	100
*Alger, John	100
Allen, C. Bruce	100
Allen, Edward Ellis	100
*Allhusen, Christian	1,000
Allsopp, Henry (Samuel Allsopp and Sons)	1,000
Amies, Nathaniel Jones	100
*Anderson, Sir James	100
Anderson, Thomas	100
*Andrew, W. P.	500
Angell, Joseph	500
*Ansted, David Thos.	100
Answorth, W. S. (Middleton and Answorth)	100
*Antrobus, Sir Edmund, Bart.	2,000
*Appold, John G., F.R.S.	1,000
Archer, T. C.	100
Armitage, Elkanah, and Sons	1,000
Armitage, William (Armitage and Rigbys)	500
*Armstrong, Sir William George, C.B.	500
*Ashburton, Lord	3,000
Ashford, William (W. and G. Ashford and Winder)	100
Ashton, Thomas	500
Asprey, Charles	1,000
*Atkinson, William	100
Austin, George	100
Bagley, Thomas (Henderson and Co.)	300
*Bake, Henry	200
Baker, Anthony Kington	100
Balderson, Henry	100
Balfour, George Edward	250
*Ball, John	500
*Balleras, Guillermo Esteban	£500
*Baring, Thos., M.P.	3,900
Barker, T. Herbert, M.D., F.R.S.	100
Barlow, Edward	100
Barlow, Frederick Pratt (John Dickinson & Co.)	1,000
Barrett, Henry (R. Barrett and Sons)	200
*Bartlett, William Edward	100
*Bateman, J. F.	200
*Bateman, Joseph, LL.D.	100
*Bates, Joshua	3,000
Bauer, Victor	100
*Bax, Ed.	100
*Bazley, Thomas, M.P.	1,000
Beale, Samuel, M.P.	1,000
Beaumont, John	500
Beaumont, Joseph, jun.	250
Beckwith, Edward Lonsdale (Boord, Son, and Beckwith)	500
*Begbie, Thos. S.	500
Behrens, Solomon Levy	300
*Belcher, Sir Edwd.	100
*Bell, John	100
Bellville, W. J.	100
*Bendon, George	100
*Benedict, Jules	300
Benham, Fred. (Benham and Sons)	500
Bennett, Henry	200
*Bennett, John	500
Bennett, Wm. Cox	100
Bentall, Edward Hammond	100
Bentley, Joseph	100
Benyon, Richard, M.P.	1,000
Besley, Frederick	200
Besley, Robt.	200
Bessborough, Earl of	300
Beveridge, Erskine	500
Bevington, Samuel B. (Bevingtons and Sons)	100
Bevington, James B.	100
*Beyer, Charles Frederick (Beyer, Peacock, and Co.)	1,000
Bicknell, Henry Sanforth	500
Biddle, Daniel	500
Billinge, James	100
Bingley, Alfred William	100
Bird, George	500
Bird, Stephen	250
*Bird, William	100
Birkbeck, George Henry (Birkbeck and Tongue)	300
Blacklock, William Thomas	500
Blackwell, Samuel	200
Blackwell, Thomas (Crosse and Blackwell)	300
*Blair, Harrison	200
Blandy, John Jackson	100
*Blashfield, John Mariott	100
Blews, W. H. M. (William Blews and Son)	100
*Bodkin, William Henry (Assistant Judge)	500
*Boileau, Sir John P., Bart.	500
Bowker, Charles Hardy	100
*Bowring, Edgar Alfred	200
Bowley, Robert Kanzon	500
*Braby, Frederick	100
Bradbury and Evans	1,000
*Bragg, John (T. and J. Bragg)	100
*Branston, Robt. E.	250
*Brassey, Thos.	2,000
Breach, J. G.	250
Breffit, E. (Aire and Calder Company)	1,000
*Brett, John W.	500
Brewster, Sir David, K.H.	100
*Bridson, H.	250
Brigg, John Fligg (J. Brigg and Co.)	150
Briggs, Geo.	100
Brock, William	250
Brodie, John Lamont	100
*Brook, Charles	200
Brook, Charles, jun. (Jonas Brook & Brothers)	1,000

*Brooke, Chas. F.R.S. ....	... ...	£100	*Cole, Henry, C.B. ....	... ...	... ...	... £300
Brooke, George (Starkey, Bros.) ....	... ...	1,000	Cole, Thomas ....	... ...	... ...	100
Brooke, Thomas (John Brooke and Sons) ....	... ...	1,000	Coles, Richard (Mayor of Southampton) ....	... ...	... ...	100
*Brooks, Vincent....	... ...	200	Collard, C. L. (Collard and Collard) ....	... ...	... ...	1,000
*Brooman, Richd. Archibald ....	... ...	250	Collins, Thomas Samuel, M.P. ....	... ...	... ...	200
*Brough, George (Stratton and Brough) ....	... ...	200	*Collyer, Robt., M.D. ....	... ...	... ...	500
Brown, Mrs. H. ....	... ...	500	*Colman, Edwd. (J. and J. Colman) ....	... ...	... ...	1,000
Brown, John (John Brown and Co.) ....	... ...	250	*Colnaghi, D. (Colnaghi, Scott, and Co.) ....	... ...	... ...	1,000
Brown, Michael Lewis ....	... ...	100	*Colquhoun, John C. ....	... ...	... ...	100
Browning, John (Spencer, Browning and Co.) ....	... ...	250	Conolly, Thomas, M.P. ....	... ...	... ...	1,000
*Brumlees, James ....	... ...	1,000	*Conybear, H. ....	... ...	... ...	1,500
Buckley, Nathaniel ....	... ...	100	*Cook, Thos. W....	... ...	... ...	250
*Buccleuch, Duke of, K.G. ....	... ...	5,000	Cooke, Christopher ....	... ...	... ...	250
Buck, Joseph ....	... ...	100	Cooke, Hindley, and Law ....	... ...	... ...	1,000
Buckton, Joshua ....	... ...	100	Cooke, Wm. ....	... ...	... ...	1,000
Bunning, Jas. Bunstone ....	... ...	500	Coope, Octavius Edward ....	... ...	... ...	1,000
Burgess, James Reeve ....	... ...	100	*Corbett, John ....	... ...	... ...	100
Burrell, Charles ....	... ...	500	*Corderoy, Edward ....	... ...	... ...	100
*Burt, Henry Potter ....	... ...	500	*Cornforth, John....	... ...	... ...	100
*Burzorjee, Dr. ....	... ...	100	Copestake, Sampson (Copestake, Moore, Cramp-ton, and Co.) ....	... ...	... ...	1,000
Cadbury, James ....	... ...	250	Cottam, Edward (Robinson and Cottam) ....	... ...	... ...	300
Caley, Frederick C. (Caley, Brothers) ....	... ...	100	Cottam, Louis (Cottam and Co.) ....	... ...	... ...	300
Caley, Nathaniel Henry ....	... ...	100	*Coulthurst, Wm. M. ....	... ...	... ...	1,000
Callaghan, William ....	... ...	200	Cousens, Frederick William ....	... ...	... ...	300
*Callow, Thomas (Callow and Son) ....	... ...	100	*Coutts, Miss Burdett ....	... ...	... ...	3,000
Calvert, Henry ....	... ...	100	Cowlishaw, Wm. George (James Houldsworth and Co.) ....	... ...	... ...	200
Cama, Muncherjee Hormusjee....	... ...	200	*Cowie, Thos. S....	... ...	... ...	500
*Campbell, C. Minton ....	... ...	2,000	Cowper, Henry ....	... ...	... ...	100
*Campbell, James ....	... ...	100	*Cowper, The Right Hon. Wm., M.P. ....	... ...	... ...	100
Candy, Charles ....	... ...	500	*Crace, John Gregory ....	... ...	... ...	200
Cannan, Herbert Harris ....	... ...	100	*Crampton, T. R. ....	... ...	... ...	1,000
*Cassell, Petter and Galpin ....	... ...	250	*Creed, Henry ....	... ...	... ...	100
Carstairs, Peter ....	... ...	200	*Cremer, William Henry, jun. ....	... ...	... ...	200
Carver, John (Carver Brothers) ....	... ...	100	*Crisp, Thomas Dawson (Clabburn, Sons, and Crisp) ....	... ...	... ...	100
Carve, Stephen, M.P. ....	... ...	500	*Croll, Alexander Angus ....	... ...	... ...	1,000
*Chadwick, David ....	... ...	100	Crossfield, Henry ....	... ...	... ...	500
*Chadwick, Edwin, C.B. ....	... ...	100	Cubitt, Lewis ....	... ...	... ...	500
*Chadwick, John ....	... ...	200	*Cubitt, Wm. M.P. (Lord Mayor of London) ....	... ...	... ...	1,000
*Challoner, Col. T. C. B. ....	... ...	500	*Cundall, Joseph ....	... ...	... ...	100
Chambers, Geo. Wilton (Geo. Wright & Co.) ....	... ...	500	*Cunningham, H. D. P., R.N. ....	... ...	... ...	100
Chambers, Thomas, Common Serjeant ....	... ...	100	Curt, Joseph ....	... ...	... ...	100
*Chambers, Thos. King, M.D. ....	... ...	300	Cuthell, Andrew ....	... ...	... ...	1,000
*Chance, James T. (Chance, Bros.) ....	... ...	1,000				
*Chandos, Marquis of ....	... ...	1,000				
*Chantrell, George Frederick ....	... ...	100				
*Chapman, Edward (Chapman and Hall) ....	... ...	300				
Chappell, Thos. (Chappell and Co.) ....	... ...	500				
*Charley, William ....	... ...	100				
*Charlton, Henry ....	... ...	100				
*Chater, Joseph ..	... ...	100				
Chatfield, Charles ....	... ...	100				
*Chawner, Richard Croft ....	... ...	100				
*Chester, Harry ....	... ...	300				
Christie, William ....	... ...	100				
Christy, Henry ....	... ...	1,000				
Christy, Richard (William M. Christy and Sons) ....	... ...	500				
*Churchward, Joseph George ....	... ...	500				
*Clabburn, W. H. ....	... ...	100				
Clanricarde Marquis of ....	... ...	500				
*Clare, Charles Leigh ....	... ...	250				
Clark, Charles, Mayor of Wolverhampton ....	... ...	100				
*Clarke, I. P. ....	... ...	100				
Clark, Sir James, Bart. ....	... ...	200				
*Claudet, A., F.R.S. ....	... ...	100				
*Clegg, Thos. ....	... ...	500				
Clifford, Charles ....	... ...	200				
Clouston, Peter (Lord Provost of Glasgow) ....	... ...	100				
Cleinnell, John Edwd. ....	... ...	100				
*Clowes, Geo. (Clowes and Son) ....	... ...	500				
*Clutton, John ....	... ...	500				
Cobbett, Arthur ....	... ...	100				
*Cobbett, Richard ....	... ...	100				
Cobden, George Long ....	... ...	300				
Cock, John, jun. ....	... ...	100				
Cockerill, William James ....	... ...	100				

Doveston, George (Doveston, Bird, and Hull)	£300	Fowler, Charles	...	...	...	...	£100
*Drax, J. S. W. Sawbridge Erle, M.P.	100	*Fowler, John	...	...	...	...	1,000
*Ducie, Earl of	500	Fownes, Edward (Fownes, Brothers, and Co.)	...	...	...	...	100
Dudley, John Crews	100	Francis, Chas. Larkin (Francis, Bros., and Pott)	...	...	...	...	500
Dugdale, James...	1,000	Franklyn, G. Woodroffe, M.P.	...	...	...	...	500
Dunlop, John Macmillan	100	*Frith, J. G.	...	...	...	...	1,000
Dunlop, Walter...	200	Froggatt, William	...	...	...	...	100
*Dunn, Thomas	250	*Fussell, Rev. J. G. C.	...	...	...	...	200
*Dunn, Thomas ...	150						
Dyte, Henry	100	Gardner, Robert...	...	...	...	...	500
Eardley, Sir Culling Eardley, Bart.	1,000	Gardner, Samuel (John Kenyon and Co.)	...	...	...	...	200
Eastlake, Sir Charles L., President of the Royal Academy	200	*Garrett, Richard	...	...	...	...	500
*Easton, James, Jun. (Easton, Amos, and Sons)	1,000	*Gaskell, John	...	...	...	...	100
*Easton, James, Sen. (Easton, Amos, and Sons)	500	*Gassiot, J. P., F.R.S.	...	...	...	...	1,000
*Ebury, Lord	500	Gilhey, Walter (W. and A. Gilhey)	...	...	...	...	1,000
*Edgar, W. S. (Swan and Edgar)	1,000	*Gibbs, Henry Hucks	...	...	...	...	500
*Edgington, Benjamin	500	*Gibson, The Right Hon. Th. Milner, M.P....	...	...	...	...	1,000
Edmeston, James	100	Gifford, W. J.	...	...	...	...	200
*Edwards, J. Passmore	100	*Gilbee, William Armond	...	...	...	...	100
Edwards, Morton	100	*Glaisher, James, F.R.S.	...	...	...	...	100
Edwards, Richard (J. Edwards and Son)	500	*Glover, Thomas	...	...	...	...	1,000
*Elkington and Co.	2,000	Glyn, George Carr, M.P.	...	...	...	...	500
*Elliott, Charles (Elliott Brothers)	300	Glyn, Sir Richard Plumptre, Bart.	...	...	...	...	500
*Elliott, George Augustus	100	*Glynn, Joseph, F.R.S.	...	...	...	...	100
Elwell, Edward...	200	*Godwin, George, F.R.S.	...	...	...	...	200
*Emanuel, Harry	1,000	Gooddy, Edward (Barlow, Gooddy, and Jones)	...	...	...	...	250
England, George	1,000	*Goode, Thos. (Goode and Co.)	...	...	...	...	250
*Ernest, Henry (Coleman, Ernest, and Rowe)	250	Gooden, J. Chisholm	...	...	...	...	200
Evans, Edward	100	Goodman, John Dent	...	...	...	...	100
Evans, E. Bickerton	100	Goore, William Henry P.	...	...	...	...	100
*Evans, Jeremiah (J. Evans and Son)	500	Gordon, Lewis Dunbar Brodie	...	...	...	...	1,000
Evans, S. Lavington	100	*Gotto, Henry (Parkins and Gotto)	...	...	...	...	1,000
*Evill, Wm., junr.	300	*Gower, The Hon. E. F. Leveson, M.P.	...	...	...	...	200
Evestaff, William Glen...	100	*Graham, Forster (Jackson and Graham)	...	...	...	...	250
*Ewart, Wm., M.P.	500	*Graham, Peter (Jackson and Graham)	...	...	...	...	1,000
Fairbairn, Andrew	500	Graham, Wm.	...	...	...	...	1,000
*Fairbairn, Thomas	1,500	Graham, William	...	...	...	...	100
*Fairbairn, Wm., F.R.S.	1,000	*Grant, Alex.	...	...	...	...	250
Fairbairn, William Andrew	500	Grant and Gask...	...	...	...	...	500
Falmouth, Viscount	500	*Gray, Captain William, M.P....	...	...	...	...	1,000
Farrow, Charles (Farrow and Jackson)	100	*Granville, The Earl, K.G.	...	...	...	...	1,500
Farlow, Charles	100	*Green, Daniel, jun.	...	...	...	...	100
Farquhar, Thomas Newman	1,000	Green, James	...	...	...	...	100
Faulkner, David	100	Greenall, Gilbert	...	...	...	...	500
*Fauntleroy, Robert Th. (Robert Fauntleroy & Co.)	100	Gregory, Charles	...	...	...	...	500
*Fawell, Thomas	100	*Gregson, Samuel, M.P....	...	...	...	...	100
Fearon, John Peter	100	*Griffiths, Robert	...	...	...	...	250
Fenton, Francis Henry	100	Grissell, Henry	...	...	...	...	500
Feversham, Lord	100	Grove, George	...	...	...	...	100
Ferguson, John F.	200	*Guedalla, Henry	...	...	...	...	500
*Field, John	1,000	Gundry, William (Gundry and Sons)	...	...	...	...	100
*Field, William	200	Gunter, Richard	...	...	...	...	300
Filmer, Thos. H.	100	*Gurney, Samuel, M.P....	...	...	...	...	1,000
Findlay, Charles B.	100	*Gwynne, J. E. A. (Gwynne and Co.)	...	...	...	...	500
Finnis, T. Q., Alderman	1,000	Hacking, Richard	...	...	...	...	1,000
Firmin, Georga Jordana...	100	*Haden, Frs. Seymour	...	...	...	...	100
*Fisher, Anthony Lax, M.D.	100	Hadfield, William	...	...	...	...	100
Fisher, Richard	500	*Hall, S. C.	...	...	...	...	200
*Fisher, Robert	250	*Hale, Warren Stormes, Alderman	...	...	...	...	1,000
Fisher, Samuel	100	*Hancock, Charles Frederick	...	...	...	...	1,000
Fisher, Samuel	200	*Hanhart, N. (M. and N. Hanhart)	...	...	...	...	100
*Fladgate, W. M.	500	*Hankey, Thomson, M.P.	...	...	...	...	500
*Fletcher, John Bowman	100	*Hannington, Charles Smith	...	...	...	...	100
Forrest, James Alexander	100	Hargreaves, W.	...	...	...	...	200
Forster, John	250	Harris, James	...	...	...	...	200
Forster, Sampson Lloyd	100	*Harrison, T. E....	...	...	...	...	100
Forster, Thos. (Elsmore and Forster)...	250	*Harrison, W., F.G.S.	...	...	...	...	500
*Fortescue, The Hon. Dudley Francis, M.P.	100	*Hart, Charles (Joseph Hart and Son)...	...	...	...	...	100
Fortnum, Chas. Drury Edward	500	Hart, Ernest	...	...	...	...	100
*Foster, John Porter (Foster, Porter, & Co.)	1,000	Harter, James Collier	...	...	...	...	1,000
Foster, Wm. Orme, M.P.	1,000	*Hartley, James (J. Hartley and Co.)...	...	...	...	...	1,000
*Fothergill, Benjamin	100	Hatch, Henry	...	...	...	...	100
*Fowke, Captain Francis, R.E....	300	Haward, H. G.	...	...	...	...	100
		Hawkins, George	...	...	...	...	200
		*Hawkshaw, John, F.R.S.	...	...	...	...	1,000

Haworth, J. ...	£100	Johnson, Frederick ...	... 2,600
Hayes, Henry William (Hayes and Co.) ...	1,000	Johnson, J. M., ...	... 100
Headley, Richard ...	100	*Johnson, Henry ...	... 1,000
Heald, Nicholas ...	100	*Johnson, Richard ...	... 100
*Healey, Elkanah ...	100	*Jones, David Morgan (John Morgan and Co.) ...	100
*Heather, James ...	100	Jones, Frederick John ...	... 100
Hemming, Frederick H. ...	100	Jones, Edward ...	... 100
Henderson, John (Banks Bros., Henderson & Co.)	200	Jones, John ...	... 500
Henderson, George William Mercer ...	500	*Jones, Owen ...	... 100
Henty, Robert ...	500	*Joubert, Ferdinand ...	... 200
Hepworth, William ...	100		
Heron, Joseph ...	250	*Keeling, Henry Levy ...	... 250
Heugh, John ...	500	Keighley, William ...	... 250
*Heymann, Lewis, (Heymann and Alexander) ...	1,000	*Keith, Daniel ...	... 500
*Heywood, J. Sharp C. ...	500	*Kelk, John ...	... 3,000
Hibbert, George ...	500	*Kelly, Sir Fitzroy, Q.C., M.P. ...	... 1,000
Hibbert, John Tomlinson ...	100	*Kelsall, Henry (Kelsall and Kemp) ...	... 200
Hill, Charles ...	300	*Kent, George ...	... 200
Hill, Thomas Rowley (Hill and Evans) ...	100	*Kimber, Thomas ...	... 200
Hindley, Charles Hugh (Chas. Hindley and Sons) ...	1,000	*Kinpton, Thomas ...	... 250
Hinstin, Ernest (Hinstin Bros.) ...	150	*Kinder, Arthur ...	... 100
Hirst, Joseph ...	500	*Kisch, S. Abraham ...	... 100
Hirst, William Edwards ...	250	*Kitson, James (Mayor of Leeds) ...	500
Hitchcock, George Charles ...	250	*Knight, George ...	... 100
*Hobbs, Ashley, and Co. ...	1,000	Knill, Stuart ...	... 250
Hodges, John Francis ...	100	Knowles, John ...	... 100
Hodgkinson, Grosvenor, M.P. ...	100		
Hodgson, Kirkman Daniel, M.P. ...	500	*Ladd, Wm. ...	... 100
Holdsworth, William Bayley (W. B. Holdsworth & Co.) ...	100	*Lambert, Charles (Lambert and Butler) ...	500
Holland, James (Holland and Sons) ...	1,000	*Lambert, Thomas (T. Lambert and Son) ...	500
Holland, Sir Henry, Bart. ...	200	*Landon, James ...	... 100
*Hollins, M. Dainty ...	2,000	*Lang, Robert ...	... 100
*Holmes, James ...	300	*Langton, Wm. H. Gore, M.P. ...	500
Hoole, Henry E. ...	500	*Langworthy, Edward Riley ...	... 250
*Hope, Henry Thomas ...	2,000	*Lankester, Edwin, M.D. ...	100
*Hooper, Geo. N. (Hooper and Co.) ...	250	*Lansdowne, Marquis of, K.G. ...	1,000
Hopkinson, James (J. and J. Hopkinson) ...	200	*Lavanchy, John R. ...	... 100
*Hopkinson, Jonathan ...	500	*Lawrence, Frederick ...	... 200
*Horn, James ...	100	*Lawson, A. M. (Peter Lawson and Son) ...	1,000
Hornblower, Jethro (Hornblower, Fenwick, and Co.) ...	500	*Lea, John W. (Lea and Perrins) ...	100
*Hoskyns, Chandos Wren ...	500	*Leaf, Sons, and Co. ...	1,000
Horsley, J. Calcott, A.R.A. ...	100	*Leather, J. Towler ...	500
Horton, Isaac (Horton and Sons) ...	500	*Le Breton, Francis ...	200
*Houghton, F. Burnett ...	100	Ledger, Robert Goulding ...	100
Hovenden, Robert ...	100	Lee, Levin (Lee Brothers) ...	100
*Hubert, Samuel Morton (John Woollams & Co.) ...	500	*Leeks, Edward Frederick ...	100
Hughes, James ...	100	*Leighton, John ...	250
*Humby, George ...	100	*Leeman, George (Lord Mayor of York) ...	200
*Hunt, John (Hunt and Roskell) ...	2,000	Leppoc, Henry Julius ...	100
*Hunt, Henry A. ...	500	Lethbridge, J. C. ...	500
Hunt, T. N. ...	500	*Letts, Thomas, jun. ...	100
Hunter, Michael, jun. (Master Cutler of Sheffield) ...	100	Leuchars, William ...	500
Hutchinson, John (Hutchinson & Earle) ...	1,000	*Levinsohn, Louis ...	100
*Hutt, The Right Hon. William, M.P. ...	1,000	*Lewis, Arthur (Lewis and Allenby) ...	1,000
*Hutton, Thomas ...	100	Lewis, Harvey, M.P. ...	2,000
*Hyam, David (Alfred Davis and Co.) ...	1,000	Lewis, James ...	100
Hynam, John ...	200	*Lewis, Waller, M.D. ...	100
*Ibbotson, Thos. Hamer (Ibbotson and Langford) ...	250	Lewis, Wm., Alderman ...	100
Ionides, Alexander Constantine ...	100	Lezard, Joseph (Baumé & Lezard) ...	200
*Isaacs, Saul (S. Isaac, Campbell, and Co.) ...	1,000	Liebert, Bernhard ...	500
*Jackson, John, jun. (Geo. Jackson and Sons) ...	200	Lindley, Dr. John, F.R.S. ...	100
*Jackson, John, jun. ...	100	Lings, Thomas ...	100
*Jackson, Samuel ...	200	*Little, Thomas ...	200
James, D. D. (Wm. Cory and Son) ...	500	*Lloyd, Sampson ...	200
*James, Jabez Stanley (Powis James and Co.) ...	100	Lloyd, Samuel, junr., (Lloyd and Lloyd) ...	100
*Jarrett, Griffith ...	500	*Lockwood, Ben. ...	250
*Jeanes, John (Johnstone and Jeanes) ...	500	Loader, R. and Co. ...	500
*Jeffery, Wm. S. (Howell, James, and Co.) ...	1,000	Lock, Samuel Robert (Lock and Whitfield) ...	500
Jenkins, Leonard (Jenkins, Hill, and Jenkins) ...	500	Lorimer, George (Master of Merchant Co., Edinburgh) ...	200
Joel, Joseph ...	1,500	*Losada, J. R. ...	200
Johnson, Edmund ...	100	Lowe, J. Stanley ...	100
		*Loysel, Edward, C.E. ...	1,000
		Lucas, Charles (Lucas, Bros.) ...	1,500
		Lucas, James J. H. ...	1,000
		Lucas, Thomas (Lucas, Bros.) ...	1,500

Lucas, Philip £300	*Napier, Hon. Wm. £500
Ludlam, Jeffrey 300	Needham, Wm. (Needham and Kite) 200
Lumley, Wm. Golden 100	Neighbour, George L. (Neighbour and Sons) 500
*Lutwidge, R. W. S. 500	Neild, William (Thomas Hoyle and Sons) 1,000
*Lyell, Sir Charles 300	Newbold, Robert (Jos. Rogers and Sons) 250
Lyle, James Grieve 200	Newen, George 1,000
*Lyon, Arthur 100	*Newton, Frederic (Newton and Co.) 100
*Lyons, Morris 100	*Nicholay, J. A. 1,000
*Macadam, Charles Thomas 100	*Nicholls, G. P. (J. and G. Nicholls) 200
Macarthur, Major-General Edward 1,000	Nichols, Richard 100
*Mackintosh, R. J. 100	Nichols, Robert Cradock 100
*Mackrell, W. T. 500	*Nicoll, Donald (H. J. and D. Nicoll) 1,000
*Maclea, Charles G. 200	*Nind, Philip 300
Mac Leod of Mac Leod 500	*Nightingale, Charles (W. and C. Nightingale) 250
Malcolm, John 500	North, David (Wright and North) 100
Mallinson, Thos. 500	Northcote, Stafford H. (S. Northcote and Co.) 250
*Manby, Charles, F.R.S. 100	Novelli, Augustus H. 1,500
Mansfield, Geo. (Wright and Mansfield) 300	Obbard, Robert 100
Mappin, Frederick Thorpe (Thomas Turton and Sons) } 250	*Odams, James 200
Mappin, John Newton (Mappin and Co.) 500	Olivier, Charles Henry (Olivier and Carr) 200
Mappin, Joseph Chs. (Mappin Brothers) 200	Oppenheim, John Moritz 1,000
*Marjoribanks, D. C., M.P. 1,000	Ordish, R. M. (Ordish and Le Feuvre) 100
*Marjoribanks, E. 2,000	Osborne, Charles 100
Marrian, J. P. 100	Osler, Clarkson (F. and C. Osler) 500
*Marsh, M. H., M.P. 500	Other, Christopher (Other and Hobinson) 500
Marshall, Thomas R. (Wm. Marshall and Co.) 100	Palk, Sir Lawrence, Bart., M.P. 200
Marshall, William 200	Palmer, Geo. (Huntley and Palmers) 200
Martin, George William 100	*Pakington, The Rt. Hon. Sir John, Bart., M.P. 200
Martin, Richard (Martin, Hall, and Co.) 200	Panizzi, Antonio 200
Martin, W. H. 100	*Palmer, Philip 100
Martineau, Joseph 1,000	Parker, Charles 300
Martyn, Silas Edward 200	Parker, James 100
*Maw, Geo. 250	*Part, John Cumberland 100
May, Walter (Walter May and Co.) 100	*Paterson, John 500
Maynard, Joseph 1,000	*Payne, James 250
McClure, William 100	*Peake, Thos. 250
McConnel, Henry 1,000	Pearce, John (Halling, Pearce, and Stone) 1,000
McConnel, James 100	Pease, Henry, M.P. (H. Pease and Co.) 250
McConnel, William 100	Pease, Joseph (J. and J. W. Pease) 1,000
*McCormick, William, M.P. 2,000	Pedler, George Stanbury 100
McCracken, James John (J. & R. McCracken) 200	*Peel, George 200
*McFarlane, Walter 100	Pender, John (Pender and Co.) 500
Mc Garel, Charles 1,000	*Penn, John 1,000
*McLean, John Robinson 2,000	Perry, Stephen (Perry and Co.) 100
McQueen, William Benjamin (McQueen, Bros.) 500	Philips, Robert Nathaniel 100
*Mechi, J. J. Alderman 1,000	Phillips, Fredk. D., (Phillips and Samson) 100
Mellor, Wright 250	Phillips, Mark 100
*Messenger, Samuel (Messenger and Co.) 500	Phillips, George (W. P. and G. Phillips) 500
Metchim, William Paul 100	*Phillips, Robt. 1,000
Metzler, George (Metzler and Co.) 300	*Phillips, Sir Thomas, F.G.S. 300
Meyers, Barnett 100	*Phillips, Wm. Phillips (W. P. and G. Phillips) 500
Michell, Richard 300	Phythian, Thomas 100
Micholls, Henry 100	Pike, Robert 100
Miles, Alfred Webb 300	*Pickstone, William 100
*Miles, Pliny 200	*Pillischer, M. 100
Mills, Charles 500	*Pinches, T. R. 150
Mills, Edward W. 500	Pitts, Samuel 100
*Mitchell, Rev. M. 100	*Platt, John (Platt, Brothers, and Co.) 500
Moate, Charles R. 1,000	Playfair, Dr. Lyon, C.B. 200
*Montgomerie, H. E. 100	Plowman, Joseph 100
*Moreland, Joseph 100	*Pollard, Geo. 100
Moreton, John 100	Poole, Henry 1,000
*Morley, Samuel 1,000	Poole, Thos. (Poole and Macgillivray) 100
Morgan, John 100	Pope, W. A. 100
*Morgan, Wm. Vaughan (Patent Plumbago Crucible Company) } 500	*Portal, Wyndham S. 100
Mosley, Thos. (Thos. Mosley, Huish, and Co.) 100	Potter, Alan 1,500
*Muir, William 100	*Potter, Edmund, F.R.S. 500
*Munn, Major W. Augustus 100	*Potter, William Simpson 500
*Murchison, John Henry 100	Poulter, James 100
Murchison, Sir Roderick Impey, F.R.S. 500	Powell, William (John Hardman & Co.) 500
Murray, Eugene 200	Power, Bonamy Mansell 1,000
*Murray, John 1,000	*Prescott, W. G. 1,000
*Myers, George 1,000	Price, David 1,000
	Price, Dr. David Simpson 100

Price, George ...	£100	Schwabe, Adolph (Salis, Schwabe, and Co.) ...	£500
*Pritchard, John, M.P. ...	200	Scott, Walter ...	100
Privett, Harry ...	100	Scott, William (Rogerson and Co.) ...	1,000
Pursell, Alfred ...	100	Seaman, William Mantle ...	100
*Purvis, Prior, M.D. ...	100	*Sedgwick, John Bell ...	100
Quin, Fredk. F., M.D. ...	200	Shanks, Andrew ...	250
Quilter, William ...	100	*Sharples, Joseph ...	200
Ramsay, Rear Admiral Wm., C.B. ...	100	Shaw, Charles Thomas ...	100
*Ransford, Henry ...	100	*Shearer, B. P. ...	200
*Ratcliff, Charles ...	500	Shelley, Sir John Villiers, Bart., M.P. ...	100
*Rawlinson, Robert ...	100	*Sheriff, Alexander Clunes ...	100
*Read, Reginald, M.D. ...	200	Shilson, William ...	200
*Redgrave, Alex. ...	100	Shove, W. S. ...	500
Redgrave, Richard, R.A. ...	200	*Shuttleworth, Joseph ...	1,000
*Redgrave, Samuel ...	200	*Siemens, Charles W. ...	100
Reed, Charles, F.S.A. ...	100	Silk, Robt. (Silk and Sons) ...	100
*Reiss, James ...	500	Siltzer, John (Siltzer and Co.) ...	500
Rich, Sir Charles, Bart. ...	200	*Simon, George (Lightly and Simon) ...	500
Richards, Westley ...	200	*Simpson, W. B. ...	100
Richardson, James (Richardson Brothers) ...	500	Slade, Felix ...	500
Richardson, John (Henri's Patent Cattle Feed Company) ...	100	*Slaney, Robt. A., M.P. ...	100
Richardson, G. B. ...	100	*Smirke, Sydney, R.A. ...	1,000
*Richardson, Thomas ...	200	Smith, George (Wm. Smith, Son, and Co.) ...	500
Rickards, Francis Philip ...	100	*Smith, George Henry (Wrigley and Smith) ...	100
*Rideout, William Jackson ...	250	Smith, George Robert ...	500
*Rimmel, Eugene ...	100	*Smith, James ...	500
Robb, Alexander ...	500	Smith, John ...	100
Roberts, Daniel ...	100	Smith, John (Beckett & Co., Bankers) ...	1,000
Roberts, Edward, F.S.A. ...	100	Smith, Mark (Wm. Smith and Brothers) ...	300
Robertson, David (Robertson Brothers, and Co.) ...	100	Smith, R. M. ...	250
Robinson, F. (Robinson and Cottam) ...	300	*Smith, Wm. H. ...	500
*Robinson, Henry Oliver ...	500	Smith, William ...	100
*Robinson, James (Rigby and Robinson) ...	500	*Smith, William, C.E. ...	150
Robinson, J. C. ...	100	Snelgrove, John (Marshall and Snelgrove) ...	1,000
Robinson, John (Sharp, Stewart, and Co.) ...	500	*Solly, S. R., F.R.S. ...	300
Robinson, John Henry ...	100	Solomon, Henry ...	250
Robotham, Samuel ...	100	*Solomon, Joseph ...	100
*Rock, James, junr. ...	100	Solomon, Leon ...	1,000
Roe, George ...	250	*Somes, Joseph, M.P. ...	1,000
Roebuck, Samuel ...	100	*Sopwith, Thos., F.R.S. ...	200
Rogers, Francis ...	100	Sotheby S. Leigh ...	500
Rolt, Peter ...	1,000	Sowler, John ...	100
*Roney, Sir Cusack P. ...	1,000	Sowler, Thomas ...	100
Rose, Hugh (Chairman of Chamber of Commerce, Edinburgh) ...	200	*Spark, Henry King ...	500
*Rose, J. Anderson ...	100	Sparrow, Chas. (Sparrow Brothers) ...	100
*Rose, Wm. Anderson, Alderman ...	500	Spence, James ...	250
Rosse, The Earl of ...	1,000	*Spicer, Wm. R. (Spicer Brothers) ...	500
Rothery, H. Cadogan ...	100	*Spiers, Richard James ...	250
Round, Joseph ...	100	*Squire, William ...	500
*Routledge, Thomas, jun. ...	100	Stainton, James Joseph ...	100
Rumbold, Wm. Henry ...	100	Standen, Richard Spiers (Standen and Co.) ...	100
*Rumney, Robert ...	100	Standish, John ...	200
*Ryland, Arthur, Mayor of Birmingham ...	100	Stanley, Lord, of Alderley ...	500
*Rylands, John (Rylands and Sons) ...	500	*Stanley, Right Hon. Lord, M.P. ...	500
Sacred Harmonic Society, Exeter Hall ...	1,000	Standring, James (Mayor of Margate) ...	100
*Sadler, Charles James ...	100	*Stanton, George ...	100
*Salisbury, The Marquis of, K.G. ...	1,000	Starey, Thos. Rowstorn ...	200
Sandeman, George G. ...	1,000	*Star, Henry (Wheatley and Starr) ...	1,000
*Salomons, Aaron ...	1,000	Steane, James S. (Oxon Wine Co.) ...	100
*Salomons, David, Ald., M.P. ...	250	Stephenson, Henry (Stephenson, Blake, & Co.) ...	100
*Salt, Titus ...	3,000	Steers, Speeher James ...	100
Samson, Henry ...	100	Steinthal, Henry Michael ...	100
*Samuel, James ...	1,000	Stern, Sigismund James ...	500
*Sandford, Francis Richard ...	1,000	Stillwell, Edwd. Swift (Stillwell, Son, and Ledger) ...	250
Sangster, John (W. and J. Sangster) ...	100	Stirling, William (Wm. Stirling and Sons) ...	500
Sassoon, Sassoon David ...	100	Stock, T. O. ...	300
Saul, George Thomas ...	1,000	Story, George M. ...	100
*Saunders, Wm. Wilson, F.R.S. ...	500	*Straker, Samuel (Straker and Son) ...	100
Savory, John ...	500	Stubbs, Henry ...	200
Sawyer, Frederick ...	2,500	*Sullivan, Right Hon. Laurence ...	100
Schlesinger, Julius ...	100	*Sutherland, Duke of ...	500
*Schuster, Leo ...	3,000	Sutton, M. H. (Sutton and Sons) ...	250
		Sylvester, Professor J. J., F.R.S. ...	100
		*Taber, John ...	100

*Tagg, William	...	...	...	...	£100	*Whitehead, James Heywood	...	...	...	£250
Tamplin, F. A.	...	...	...	..	250	*Whittingham, Charles	...	...	...	200
Tannett, T. (Smith, Beacock, and Tannett)					500	*Whittington, Rev. Rich.	...	...	...	100
*Tapling, Thomas (Thomas Tapling and Co.)					1,000	Willans, William (President of the Chamber of Commerce, Huddersfield)	...	...	...	500
Taunton, Lord	...	...	...	...	1,000	Wildes, George	...	...	...	300
Taylor, J. Frederick	...	...	...	...	200	*Willet, John, C.E.	...	...	...	100
*Telford, Charles	...	...	...	...	500	*Wilkinson, David (Molineaux, Webb, and Co.)	...	...	...	200
Thackeray, W. M.	...	...	...	...	100	*Wilkinson, John, jun. (John Wilkinson, Son, & Co.)	...	...	...	500
Thomas, John Evan	...	...	...	...	100	*Williams, Joseph William Hume	...	...	...	100
*Thompson, Harry S., M.P.	...	...	...	...	250	*Williams, H. R.	...	...	...	100
Thompson, R. A.	...	...	...	...	100	*Williams, Wm.	...	...	...	100
Thompson, William	...	...	...	...	250	Williamson, Robert	...	...	...	100
*Thrинг, Henry	...	...	...	...	100	Willis, George (Willis and Sotheran)	...	...	...	500
*Thurston and Co.	...	...	...	...	500	Willoughby d'Eresby, Lord	...	...	...	1,000
Tillett, Samuel	...	...	...	...	100	Wilson, Erasmus, F.R.S.	...	...	...	200
*Todé, Edward Henri	...	...	...	...	300	*Wilson, George F., F.R.S.	...	...	...	500
Tod-Healy, Grant H.	...	...	...	...	300	*Wilson, Professor John	...	...	...	300
*Topham, John	...	...	...	...	150	*Winkworth, Thomas	...	...	...	100
*Tottie, Charles	...	...	...	...	500	Winsor, William (Winsor and Newton)	...	...	...	500
*Tootal, Edward	...	...	...	...	500	*Withers, Geo.	...	...	...	100
Towle, John	...	...	...	...	100	*Wodderspoon, James	...	...	...	1,000
Tregelles, Nathaniel (Tregelles and Taylor)					100	Wodehouse, Lord	...	...	...	100
Treggon, Wm. Thomas (Treggon and Co.)					100	*Wood, John	...	...	...	100
Trower, Geo. S.	...	...	...	...	200	Wood, Joseph	...	...	...	100
Truscott, Francis Wyatt (Truscott, Son, and Simmons)	...	...	...	...	500	*Wood, Nicholas	...	...	...	100
Truss, T. Seville	...	...	...	...	100	*Wood, Vice-Chancellor Sir W. Page	...	...	...	100
Tubbs, Robert	...	...	...	...	100	Woodcock, William	...	...	...	100
Tuelly, Nathaniel C.	...	...	...	...	100	*Wood, Basil T., M.P.	...	...	...	250
Turner, B. B. (Brecknell, Turner, and Sons)					500	*Wood, Robert Ballard	...	...	...	500
*Twining, Thos., jun.	...	...	...	...	1,000	*Woodhouse, John Thomas	...	...	...	500
*Tylor, Alfred (J. Tylor and Sons)	...	...	...	...	1,000	*Woollams, Henry (Wm. Woollams and Co.)	...	...	...	250
Tysoe, John	...	...	...	...	100	*Woolcombe, Thomas	...	...	...	100
Underhay, Frederick George	...	...	...	...	100	Wright, T. B.	...	...	...	100
*Underwood, Joseph	...	...	...	...	1,000	Wrigley, Thomas	...	...	...	500
Uzielli, Theresa	...	...	...	...	5,000	Wrigley, Joseph, Jun. (J. and T. C. Wrigley and Co.)	...	...	...	250
*Uzielli, Theodosius	...	...	...	...	3,900	*Wyatt, M. Digby	...	...	...	100
Vallentin, James	...	...	...	...	200	Wyld, William	...	...	...	100
*Venning, James M.	...	...	...	...	100	*Yolland, Col. Wm.	...	...	...	100
*Veitch, James Jun.	...	...	...	...	100	Younghusband, Joseph Taylor	...	...	...	500
Vernon, G. Harcourt	...	...	...	...	100	*Zanzi, Alexander	...	...	...	100
Viccars, Richard	...	...	...	...	250	Her Majesty's Commissioners have appointed the following Committees :—				
Vickers, Henry (Mayor of Sheffield)					100					
*Vieweg, Augustus Julius					200					
*Vignoles, Charles F. R. S.					1,000					
*Vigors, Edward					100					
*Virtue, James Sprent					500					
*Walker, James, F.R.S....	...	...	...	...	1,000					
Walker, Joseph William	...	...	...	...	250					
Wallis, John	...	...	...	...	100					
*Walter, Captain Edward	...	...	...	...	500					
Walters, Edward	...	...	...	...	100					
*Ward, John	...	...	...	...	500					
Watkins, William	...	...	...	...	100					
Watson, J. (James Nisbet and Co.)					100					
*Webb, John	...	...	...	...	500					
Webster and Horsfall	...	...	...	...	500					
*Welch, John Kemp	...	...	...	...	500					
*Welch, John Kemp (Schweppes and Co.)					500					
*Westhead, J. P. Brown, M.P. (J. P. and E. Westhead and Co.)	...	...	...	...	1,000					
*Westley, W. (Carpenter and Westley)					200					
*Westmacott, Richard, R.A.	...	...	...	...	100					
*Wetter, Conrad	...	...	...	...	100					
*Whatman, James	...	...	...	...	1,000					
Whelon, W. (Mayor of Lancaster)					100					
*Whichcord, John, F.S.A.	...	...	...	...	500					
*Whishaw, James	...	...	...	...	100					
White, Arthur Bernard	...	...	...	...	100					
White, Geo. (J. B. White and Brothers)					500					
White, Henry	...	...	...	...	100					
*White, Henry Clarence	...	...	...	...	250					

In connection with Classes 5, 7, 8, and 10 (Railway plant, Manufacturing Machines, Machinery in general, Civil Engineering, Architectural and Building Contrivances), the Duke of Sutherland, the Earl of Caithness, John Anderson, Esq., Frederick J. Bramwell, Esq., Joseph Cubitt, Esq., James Fenton, Esq., John Ferrie, Esq., Captain Douglas Galton, R.E., Thomas Elliot Harrison, Esq., George Wiloughby Hemans, Esq., Sampson Lloyd, Esq., John Robinson McClean, Esq., Henry Maudslay, Esq., John Penn, Esq., John Scott Russell, Esq., F.R.S.

In connection with Class 11 (Military Engineering, Armour and Accoutrements, Ordnance and Small Arms), Major-General the Hon. James Lindsay, M.P.; Colonel Shafra Adair, Suffolk Militia Artillery; Captain Tyler, R.E.; Major Porter, R.E.; Lieutenant-Colonel A. Lane Fox, Grenadier Guards; and Captain A. C. Tupper, Brecknockshire Rifle Militia.

In connection with Class 14 (Philosophical Instruments and processes depending on their use), Sir David Brewster, F.R.S.; Professor B. C. Brodie, F.R.S.; Mr. Charles Brooke, F.R.S.; Dr. Carpenter, F.R.S.; Dr. Franklin, F.R.S.; Mr. Francis Galton, F.R.S.; Mr. J. P. Gassiot, F.R.S.; Professor Tyndall, F.R.S.; and Professor Wheatstone, F.R.S.

The Commissioners have received information that Local Committees have already been formed

(in addition to those given last week) at the following places :—

BRISTOL.

Local Committee :—

The Mayor; Robt. Laing, Chas. Nash, John Hare, Esquires, Town Councillors; and Wm. Nash, Esq., Magistrate; Dan. Burgess, jun., Esq., Town Clerk.

IPSWICH.

Edward Grimwade, Esq., Mayor, Chairman.

NORTHAMPTON.

Pickering Phipps, Esq., Mayor, Honorary Secretary.

OXFORD.

The Mayor, Chairman.

R. J. Spiers, Esq., F.S.A., J.P., Honorary Secretary.

WORCESTER.

The Town Council and Chamber of Commerce.

Richard Woof, } Esqrs., Honorary Secretaries.
George Clarke,

The following arrangements (in addition to those published last week) have been made in foreign countries to represent the interests of intending exhibitors :—

FRANCE.

The following Commission has been appointed :—

The Prince Jérôme Napoléon, President.

M. Rouher, M. le Comte de Persigny, M. le Maréchal Comte Vaillant, M. Thouvenel, M. Achille Fould, M. Drouyn de Lhuys, M. Schneider, M. Mérimee, M. Michel Chevalier, M. Baron Gros, M. Arlès-Dufour, M. Leplay, and M. Gervais (de Caen).

CONVERSAZIONE.

The Second Conversazione of the present Session will be held on Saturday, the 1st June, at the South Kensington Museum. The card for this Conversazione will admit the Member and two ladies, or one gentleman.

TENTH ANNUAL CONFERENCE.— NOTICE TO INSTITUTIONS.

The Tenth Annual Conference between the Representatives of the Institutions in Union and the Council will be held on Tuesday, the 18th of June, at half-past 10 o'clock in the morning. Sir Thomas Phillips, Chairman of the Council, will preside.

Secretaries of Institutions in Union are requested to forward, as soon as possible, to the Secretary of the Society of Arts, the names of the Representatives appointed to attend the Conference, stating at the same time (if possible) whether those gentlemen will also be present at the Society's Annual Dinner, which will take place on the following day, and of which particulars are given below.

The Chairmen of, or Representatives from, the several Local Boards of Examiners are invited to attend.

ANNUAL DINNER.

The One Hundred and Seventh Anniversary Dinner of the Society will take place at the Crystal Palace, Sydenham, on Wednesday, the 19th June, at 5 o'clock, punctually. The Right Hon. the Earl of Elgin and Kincardine, K.T., G.C.B., will preside.

The Members and their friends will assemble in the ante-room of the Dining Hall, in the Railway-wing, at half-past four o'clock. Application for Tickets (price 10s. 6d. each) should be made to Mr. Samuel Thomas Davenport, at the Society's House, on and after Wednesday next, the 29th of May. It is particularly requested that those who intend to be present should take their tickets as soon as possible in order to facilitate the arrangements.

TWENTY-THIRD ORDINARY MEETING.

WEDNESDAY, MAY 22, 1861.

The Twenty-Third Ordinary Meeting of the One Hundred and Seventh Session was held on Wednesday, the 22nd inst., John Dillon, Esq., Vice-President, in the chair.

The following gentlemen were proposed for election as members of the Society :—

Bashford, Frederick	43, Porchester-square, Hyde-park, W.
Butter, Henry	4, Minerva-place, Barnsbury-park, N.
Cousens, Richard Thos.	4, Kensington-palace-gardens, W.
Cremer, William Henry	27, New Bond-street, W.
Galen, Alexander	8, Percy-circus, Pentonville, W.C.
Holden, Isaac	Dockroyd, Yorkshire.
Moule, John	15, Seabright-place West, Hackney-road, N.E.
Rothschild, Baron Lionel N. de, M.P.	New-court, St. Swithin's-lane, E.C.; Kingston-house, Prince's-gate, S.W.; and Gunnersbury-park, Ealing, W.
Smith, George	27, Norfolk-crescent, Hyde-park, W.
Tuckett, C., Junr.	British Museum, W.C.
Webb, Thomas	37, Bedford-place, Russell-sq., W.C.

The following candidates were balloted for and duly elected members of the Society :—

Atkins, John P.	Halstead-place, Sevenoaks, Kent.
Barnett, George Henry	42, Wilton-crescent, S.W.
Boyes, John	8, Kensington-garden-terrace, W.
Brown, Edward	East-hill, Wandsworth, S.W.
Chomel, J. A.	4, St. James's-street, S.W.
Cohen, Barnet Solomon	9, Magdalen-row, Goodman's fields, E.
Douglas, Sir Charles, K.C.M.G., M.P.	27, Wilton-crescent, S.W.
Garnett, William J., M.P.	21, Grosvenor-place, S.W.
Goff, Joseph, Jun.	Little Cashiobury, Watford.
Goldsmid, Frederick, D.	50, Harley-street, W.

Gridley, Captain H. Gil-	{ 49, Wilton-crescent, Belgrave-
lett	square, S.W.
Hamilton, Sir Robert N.	{ 129, Park-street, Grosvenor-
C., Bart.	square, W.
Howard, Sir Ralph, Bart.	17, Belgrave-square, S.W.
Innes, John, Jun.	46, Porchester-terrace, W.
Jackson, Richard Medland	45, Piccadilly, W.
Knight, Valentine	{ 3, Cornwall-terrace, Regent's-
	park, N.W.
Losada, J. R.	105, Regent-street, W.
Marjoribanks, Edward ..	34, Wimpole-street, W.
Meekins, T. Mossom, B.A.	32, Lincoln's-inn-fields, W.C.
Moreton, Hon. A. H. Mac-	{ 112, Gloucester-place, Port-
Donald.	man-square, W.
Neal, John	16, St. James's-place, S.W.
Palliser, Captain Arthur	{ 70, Inverness-terrace, Kens-
	ington-gardens, W.
Park, Lieut. - Colonel	{ 41, Porchester-square, W.
Archibald	
Petrie, Samuel	46, Ebury-street, S.W.
Reid, Lestock Robert ..	{ 122, Westbourne - terrace,
	Hyde-park, W.
Bennie, George Banks ..	39, Wilton-crescent, S.W.
Routledge, G. F.	{ 21, Kensington-park-gardens,
	W.
Scott, J. S.	{ 46, Kensington-park-gardens,
	W.
Sibthorp, Henry A. M.	{ 57, Chester-square, S.W.
Waldo	
Sparkhall, Edward ..	142, Cheapside, E.C.
Taylor, James George ...	{ 23, Norfolk-crescent, Hyde-
	park, W.

The Paper read was—

ON A NEW METHOD OF PRODUCING ON
GLASS, PHOTOGRAPHS OR OTHER PICTURES,
IN ENAMEL COLOURS.

By F. JOUBERT.

Of all the inventions to which the genius of man has given birth, and which have been progressively developed and brought, by his industry, to a high degree of perfection and usefulness, the art of glass-making is certainly one of the most interesting and extraordinary; at the same time as it is doubtless one which has tended to increase our comforts and our enjoyments in a degree almost unequalled by any other discovery of modern civilization.

If we look back to the dark ages, and find that in those days even the rulers of the earth had no means of keeping rain and bad weather from their habitations, except by also shutting out the light, we shall be ready to acknowledge the astonishing results, as compared with the present state of things around us, which the persevering efforts of man have, under the guidance of an evermerciful Providence, been able to accomplish.

Before entering into the description of the process which is more immediately the subject of our meeting this evening, I would, in a concise manner, and, as far as the necessarily limited time I have to occupy this place will allow me, recapitulate the history and progress of the invention of glass itself, and of glass painting which has led to the process before us.

We have no distinct evidence to show what nation first used glass, and we must therefore be satisfied with the various traditions transmitted to us, from age to age, on the subject. One fact, however, seems established beyond the possibility of a doubt, viz.: that the greatest antiquity can be assigned to this invention, since the Egyptians and the Phoenicians had both vessels and ornaments made of glass, crude in form, but of a substance so perfect, by whatever means obtained, that it has stood the trial of several thousand years, and may be pronounced to have suffered no deterioration. Might we not, in consequence, assign to glass a place in the list of useful inventions far higher than that which it occupies; for in this we

have a discovery, the first inventors of which seem to have attained, at once, the very condition—durability—which humankind is incessantly bent upon obtaining for any produce of its hands.

But still more remote is the mention of glass in the Holy Scripture; for, if the interpretation of the text be a correct one, in the 18th chapter of Job, as also in several other parts of the Bible, is found an allusion to a substance which we imagine must have been glass. Next to this, Alexander Aphrodisius amongst the ancient Greeks, Lucretius, Flavius Vopiscus, and other Latin authors, have left us a correct description of glass. Aristophanes also alludes to glass in one of his plays, and Aristotle brings out two problems on the subject; the first, why is it we see through glass? the second, why can we not bend glass?

Admitting that these two propositions emanate from the celebrated philosopher, they appear to give conclusive evidence that glass was familiar to the Greeks.

But we may, perhaps, even trace the origin of this invention far earlier, and to the remotest period of the existence of man, by associating it with the art of making bricks, which was, it is believed, practised by the earliest inhabitants of the earth; and it is not difficult to imagine how such an art would originate.

Man was led, for his subsistence, to seek a mode of preparing animal food for his use by roasting it over the fire, and having, in course of time, built, rudely, a sort of oven made of earth, and the earth having become hardened through the action of the fire, our forefathers would soon discover all the advantages which might be derived from such a process for making bricks or pots, and utensils for common use. Specimens of the potter's art in ancient times we have in plenty, and in a variety of forms or shapes, which for elegance have not been surpassed. We need only allude to the Etruscan vases in the collection of the British Museum.

In firing bricks it will not unfrequently happen that some kind of vitrification takes place in the bricks placed in the hottest part of the fire, and one might naturally suppose that one process would lead to the other, but such does not appear to have been the case, at any rate, for many centuries. Later, horn and skins were in use down to the third or fourth centuries of the Christian era, and oiled paper or mica was also used in lieu of window glass, nearly up to the time of the reign of Elizabeth. If we are to give credence to the narrative of Pliny, to accident alone, as in many other instances, are we indebted for the discovery of glass. Some traders, being weather-bound, landed on the banks of a river in Syria, and began to prepare a place in the sand for cooking their meals, after having gathered for fuel a great quantity of an herb, known there by the name of *kali*, which plant must have contained a large proportion of carbonate of soda, and this being mixed with the sand, yielded, through the agency of the fire, a sort of vitreous substance. Such is one of the accredited versions of the origin of glass.

Glass has at all times, until recently, been thought a substance of great importance, and even amongst the primitive inhabitants of South America and of the Indian continent who were, when first visited by the early European navigators, found to possess gold and silver ornaments in abundance, it is well known that the first discoverers of those countries who happened to land in search of food or water, had no difficulty in obtaining from the natives gold in exchange for some valueless pieces of glass, or a few glass beads which they would immediately use as an ornament round their necks or their wrists. As late as the middle of the last century, glass beads of various descriptions and of all sorts of colours, were extensively manufactured in France, principally for exportation to the colonies of South America and the islands of the Pacific Ocean.

It may be said that although glass is an article of first necessity to us, it is at the same time one with the nature of which very few persons are well acquainted, and

the learned have even been often at variance as to the exact classification glass ought to belong to. It is not a mineral, since it has never been found in a primitive state in any country, neither can it be placed in the vegetable kingdom.

Glass has become with us an article so singularly cheap and common, that we are apt to lose sight of its immensely diversified qualities; but if only considered from a philosophical point of view, we shall find that few of the substances which we have in daily use, either in a simple or compound state, can be compared to glass in point of importance and of usefulness. Firstly, unlike any mineral, it is inodorous and clean to the fingers, and does not lose any of its weight by usage or wear; it is always transparent, whether in a cold or a red-hot state; it can take any shape whatever while in a state of fusion, and it retains it absolutely after it has cooled. It is capable of receiving the highest polish, and of taking any coloured tint, either on its surface or in its body; and it also has this peculiar and invaluable advantage that it does not retain the taste of any liquid or acid it may have contained; it is the most flexible of substances while in fusion, and becomes harder than any pure metal when once it has become cold; lastly, it is not liable to rust, nor to be consumed by fire.

The applications of glass are now so numerous that it is difficult to imagine any one branch of industry or of manufacture which could be carried on for a single day without the use of glass in one shape or another. To some of the most important amongst the sciences, such as chemistry, physics, astronomy, the use of glass is a matter of absolute necessity; and in proportion to the gradual and increasing requirements of these last-named sciences, especially astronomy, it will be found that the glass manufacturer has been obliged to perfect his mode of manipulation, and, by the aid of chemistry, has of late years obtained such magnificent results that the field for astronomical observation has thereby been considerably enlarged.

It appears that, although vessels made of glass had been in use for a considerable time previously, it was only about the third century of our era that glass began to be used for glazing windows. These consisted of an infinite number of small panes of various shapes, which were arranged so as to form certain designs for the ornamenting of windows in places of worship; glass having, on account of its rarity then, been almost, if not entirely, confined to that use.

St. Jerome, who wrote in the fourth century, speaks of glass in church windows; and Grégoire de Tours relates, two hundred years later, in the year 525, that a soldier of the army of the King of the Visigoths, which had invaded Auvergne, entered a church through a window, of which he broke the glass. Fortunatus, Bishop of Poictiers, towards the end of the seventh century, describes with admiration the painted windows of the Cathedral of Paris. St. Philibert, also in the seventh century, had the windows of the celebrated Abbey of Jumièges, on the banks of the Seine, near Rouen, decorated with glass.

At the beginning of the eighth century glass was unknown in England, and it was Wilfrid, Bishop of York, who died in 709, who first introduced glass into England, by sending for some glass-makers from France, according to a record kept to this day. A few years later, St. Benet, Abbot of Wearmouth, wishing to decorate the windows of his monastery, sent for some glass-makers, also from France, for it appears, from some authentic records, that the art of decorating windows with glass was practised in several parts of France, especially in Normandy, long before it was adopted in other countries.

It would seem that the art of staining glass was very early discovered, although no date can be correctly assigned to the period when stained glass for church windows was first used. The practice generally adopted was to make a sort of mosaic design, by placing an infinite number of small pieces of coloured glass together. This was in use for several centuries before the art of

painting on glass, properly speaking, was discovered, which seems to have soon extensively spread and to have been cultivated by many excellent artists, to judge by the numerous specimens still in existence on the continent. But for the 16th century, so rich already in artistic talent, was reserved the glory of carrying glass painting to a degree of excellence which has never been equalled since, and the names of Jean Cousin and Bernard de Palissy will be honoured for ever, amongst the large phalanx of glass painters in all countries. The most remarkable painted windows, perhaps, in this country, are the windows of the various Colleges at Oxford, which were executed during the 17th century by Bernard Van Linge and his pupils. William Price also repaired some of the glass paintings in Queen's College, Oxford, and in Christ Church painted a remarkable composition from the designs of Sir James Thornhill. Besides these may be mentioned the windows of Lichfield Cathedral, and several other very ancient windows in Christ Church, and especially in the residence of the Dean of Westminster, near the Abbey.

Having been, for many years, professionally acquainted with printing in connexion with the fine arts, and having observed the immense development the new art of photography has taken, and the large field it has opened for representing all sorts of subjects, of animated, as well as still life, it occurred to me that if a means could be found to print the photographic image on glass, as easily as it is done on paper, and through the agency of some chemical composition which would admit of employing ceramic or vitrifiable colours, and burning them in, a great result would be attained, and a new and considerable branch of industrial art might thereby be opened. Considering the numerous and various attempts which have, from time to time, been made to introduce a substitute for glass painting in the decoration of houses, I believe it can be said that a want was generally felt for supplying the growing taste for pictorial decoration; for glass painting is an expensive process, and requires also a considerable time to obtain a perfect result. There is a process known as lithophany, or transparent china, or biscuit slabs, which are now made, in Germany principally, and some very good specimens can be seen, but although any kind of subjects, on a small scale, can thus be represented, and with a very good effect, the slabs are heavy and thick, and can never come into use as a substitute for glass painting. Some few years ago, a new mode, which was then termed "potichomanie," was introduced, which had for a short time very great success—I allude to the mode of pasting coloured prints inside a large glass bowl, or jar, and applying a thin layer of plaster of Paris, in a liquid state, so as to fix the paper firmly, and create an opaque back-ground, by giving substance to the whole, when seen from a distance. Some very good specimens of this were obtained, and it afforded for a time an agreeable occupation to many a young lady. Another mode has also been tried, and some very pretty results produced, by applying prints obtained by lithochromy, or lithographic printing in colours, on a pane of glass, and varnishing them at the back with copal or some such varnish; these will for some time resist the effects of the weather when placed in a window, and this is perhaps the nearest approach to glass painting in point of effect yet achieved, but practically it does not answer, for the varnish will not stand exposure to the weather from outside, and the constant cleaning glass requires, renders it liable to be injured, so that the design soon perishes.

In the mode which is now introduced, no such danger or liability need be feared, since the colour has been firmly fixed in the substance of the glass by fire, and, being composed of the same elementary materials, has become part of the glass itself, and can only be destroyed by the glass being annihilated by breakage.

In order that the process may be very distinctly understood, I shall now describe it by reading that part of my specification which relates to the placing the image on the glass, fixing it, and passing it through the fire.

This invention has for its object improvements in reproducing photographic and other pictures, engravings, prints, devices, and designs, on the surfaces of glass, ceramic, and other substances requiring to be fired to fix the same thereon.

For this purpose, I proceed in the following way:—A piece of glass, which may be crown or flatted glass, being selected as free from defect as possible, is firstly well cleaned, and held horizontally while a certain liquid is poured on it. This liquid is composed of a saturated solution of bichromate of ammonia in the proportion of five parts, honey and albumen three parts of each, well mixed together, and thinned with from twenty to thirty parts of distilled water, the whole carefully filtered before using it. The preparation of the solution, and the mixing up with other ingredients, should be conducted in a room from which light is partially excluded, or under yellow light, the same as in photographic operating rooms, so that the sensitiveness of the solution may not be diminished or destroyed.

In order to obtain a perfect transfer of the image to be reproduced, the piece of glass coated with the solution, which has been properly dried by means of a gas stove (this will only occupy a few minutes) is placed face downwards on the subject to be copied in an ordinary pressure frame, such as is used for printing photographs.

The subject must be a positive picture on glass, or else on paper rendered transparent by waxing or other mode, and an exposure to the light will, in a few seconds, according to the state of the weather, show, on removing the coated glass from the pressure frame, a faintly indicated picture in a negative condition. To bring it out, an enamel colour, in a very finely divided powder, is gently rubbed over with a soft brush until the whole composition or subject appears in a perfect positive form. It is then fixed by alcohol in which a small quantity of acid, either nitric or acetic, has been mixed, being poured over the whole surface and drained off at one corner.

When the alcohol has completely evaporated, which will generally be the case in a very short time, the glass is quietly immersed horizontally, in a large pan of clean water, and left until the chromic solution has dissolved off, and nothing remains besides the enamel colour on the glass; it is then allowed to dry by itself near a heated stove, and when dry is ready to be placed in the kiln for firing.

It may be stated that enamel of any colour can be used, and that by careful registering, a variety of colours can be printed one after the other, so as to obtain a perfect imitation of a picture; also that borders of any description can be subsequently added, such as those shown in the specimens on the table, without any liability to remove or even diminish the intensity of the colour in the first firing.

It will be easy to perceive that this mode of obtaining an image on glass, in an absolutely permanent substance, and of any description, colour, or size, may prove of considerable advantage and utility for the decoration of private houses, and also for public buildings. Now that, by means of the photographic art, the most correct views of any object or of any building or scene—even portraits—can be faithfully and easily obtained; when we see every day the results of the labours of photographers in all parts of the world, in the shape of beautiful prints; when we can be made acquainted, without leaving home, with the actual costume, habitations, scenery, manners almost, of all countries, for instance, China and Japan, which have but recently opened their doors to European civilisation: when, through the same means, we are able to see, for the first time, and the learned are able to translate from, the graphic reproduction with which photography furnishes us of those early inscriptions engraved on the rocks in Asia, and by the Egyptians on their splendid monuments, I need only point out the usefulness of the mode of fixing those images, in an indelible manner, for ornamental as well as for scientific purposes.

In large cities, like London, where houses are built so close to one another, in how many places may not the process become available, by enabling anyone to introduce, for a very moderate expense, pleasing or instructive images where common plain ground glass is now used, to shut out the sight of a disagreeable object, a dead wall, or an unpleasant neighbour, without diminishing the amount of light more than is convenient.

In the library, fitting subjects might be introduced on the windows by a judicious selection of the portraits of favourite authors, or of famous scenery at home or abroad. In the dining room, also, appropriate pictures could be selected, such as flowers, fruit, or game subjects, so disposed as to harmonise with the decoration of the room. Even for domestic purposes, for lamps, or screens, or any object in glass, the process will be found useful, especially on account of its rapidity, which will enable the manufacturer to execute and to deliver an order at a very few days' notice.

DISCUSSION.

Mr. HARVEY inquired whether the method now employed for colouring daguerreotypes was applicable to the process just described, provided the colours used were such as to stand the firing.

M. JOUBERT replied in the affirmative—mineral colours being used instead of vegetable colours, as in the case of photographic colouring. The difference between the two was this:—Where they applied the colour to a photograph, or drawing upon paper, the colour remained as applied; but any one acquainted with glass painting knew that various colours were acted upon differently under the action of heat in the firing. For yellow colour they used a preparation of silver and copper, and minerals were used more or less in the preparation of all the colours for burning in. If the colours were applied by the brush, as in the colouring of daguerreotypes, the process amounted, in fact, to that of glass painting, properly speaking, instead of its being a mechanical process as this professed to be. His (M. Joubert's) object had been to bring this invention to a purely mechanical result, so as to obviate the necessity of employing artists for glass painting. The object of the invention was to reproduce photographs or designs in a perfect form by mechanical manipulation.

Mr. PHILIP PALMER would express his obligations to M. Joubert for having brought forward this subject of window glass. Important as the subject was, within the last few years it had seldom been brought before the attention of this Society. It was now thirty years since he became a member of the Society, and he recollects that at the first meeting he attended the subject was that of window glass, and he believed the same subject had only been brought before them two or three times since. The Great Exhibition of 1851 afforded an opportunity for bringing this subject forward, and the approaching Exhibition of 1862 would, he hoped, probably furnish another occasion for doing so. With regard to the antiquity of glass, he might mention that in the British Museum there was a specimen of glass said to be of a date 3,000 years before Christ. Whether that was the fact or not he did not know, but it was certain that some very old specimens of glass were to be seen in the British Museum. He quite agreed with the remark in the paper, that glass was so cheap and common that they were apt to lose sight of its immensely diversified qualities, and, therefore, any attempt to ornament it in this beautiful and artistic manner deserved the strongest encouragement of all lovers of art. There was a period in the history of the importation of painted glass which was personally interesting to himself, and which was spoken of by Horace Walpole. It was matter of history, but was connected with his (Mr. Palmer's) great-grandfather, who imported large quantities of painted glass in 1753-4, and the circumstance gave rise to an amusing chapter in Walpole's letters. With regard to the cost of glass painting, he did not know

that that was a subject which he ought to touch upon in the presence of several eminent glass painters whom he saw in the room, but he might venture to make this general remark—that a really good work of art must be well paid for; and if they employed first-rate talent, whether in painting upon glass or in architecture, that talent must be paid for; and glass painters were quite as much artists as those who painted upon canvass or paper. With regard to the decoration of glass at a moderate expense for the purpose of shutting out the view of dead walls, or a disagreeable neighbour, M. Joubert had contrasted this process with the use of plain ground glass. That had been used for a great many years; enamel patterns had been produced in such immense quantities that the use of the latter had been much larger than that of plain ground glass. The patterns had become so common that architects were always seeking for something new. This process, as it appeared to him, was calculated to supply that want, inasmuch as it enabled persons to select any number of subjects and have them reproduced. Having been connected, as he and his family had been, for a century and a half with the glass trade, he wished to express his acknowledgments to M. Joubert for having brought this subject before them; and he would add that he was quite sure all who were interested in the trade would be happy to give him the support which his ingenuity deserved, and to assist in bringing before the public this very beautiful invention.

Mr. PETER GRAHAM would ask one or two questions of a practical nature. First, what was the largest surface to which this process had yet been applied, and whether there was any limit to the surface, and how many colours could be used in combination in one picture. Also, whether there was any difficulty in employing a number of colours in combination, so as to produce a highly artistic effect; and, further, to what extent photographs could be enlarged or diminished, to bring them to such a size as might be required. He thought the invention might be applied to decorative purposes with good effect. He would also inquire what was the cost of these specimens, as compared with paintings upon glass of the same size, and whether many failures were experienced in the attempts to produce these pictures?

M. JOUBERT replied, with regard to the size, that the specimens he had exhibited, as being unburnt, $24 \times 17\frac{1}{2}$ inches, were the largest he had yet produced, but he apprehended the size was only limited by the dimensions of the kiln. There would, of course, be a little more care required in manipulating upon a large picture, but there would be no difficulty in producing a picture of three or four feet square. The only difference was the greater risk in burning it; the larger the surface of glass to be subjected to any manipulation or firing, the more the risk was increased. As to the combination of colours, if he understood the question aright, it was what combination of colours could be burnt at the same time. That was a question which he was scarcely in a position to answer with certainty at present. In the specimens upon the table, it would be observed that they were almost all of one colour. He thought it better to produce them perfectly in monochrome in the first instance, and having mastered the difficulties of manipulation in one colour, then to go to three or four colours. He would call attention to one specimen, having a coloured border with an edging which had the appearance of ground glass. It was, however, produced by a coating of flux. The coloured border was also added, and was burnt in at the same time with the white enamel—all in one firing—showing that a colour and white enamel could be accomplished at the same time. He had been able to produce four colours in one burning. He had no doubt, with improved manipulation, a variety of colours could be produced at one firing; but all glass painters were aware that to attempt to produce perfect copies of pictures, with all shades of colours, would be to branch into another line of art. Instead of being mere

printing, it would become regular glass painting. It had been his object to avoid that from the first. Glass painting was executed very beautifully in this country, and upon that subject he might remark that an art which flourished 200 hundred years ago seemed to have fallen into disuse for the last 100 years, and it was only at the beginning of the present century that glass painting had seemed to have revived. Although glass painting was not invented in England, he might say that this was the country in which that art had been kept alive more than in any other. The third question asked by Mr. Graham was with respect to the size to which pictures could be enlarged or diminished. The camera was the instrument employed both for enlarging and reducing. The enlarging of designs through the camera was practised in Paris more extensively than in this country. In a short time there would be an exhibition here, in which objects would be shown as large as life. This process was in operation at present in Paris, but a large apparatus was now being prepared for introducing it into this country. They were aware that any photograph or drawing enlarged beyond a certain point was not pleasant to look at; and in proportion as a large picture diminished it acquired finish, while, on the other hand, enlargement beyond a certain degree exaggerated the defects of the picture. With regard to the cost of these specimens as compared with ordinary glass painting, it was difficult to give an answer to that question, because there was no fixed price for glass painting with which it could be compared. The operations of the glass-painter were exposed to many accidents. A work which had occupied weeks or months might spoil in the last firing; therefore the risk, being so considerable, was one reason why the price of glass painting must be arbitrary. Taking the average of the smaller specimens exhibited, he believed they could be sold at about 8s. per square foot. It was found necessary to fix the price according to measurement. If an architect had 100 square feet to cover he must be able to estimate the cost without entering into the question of subject. He (M. Joubert) had no doubt when this invention was taken up generally by the manufacturers the cost would be very considerably reduced. With regard to the failures he had met with, if he mentioned the number of failures he experienced at the beginning, he should do a wrong thing, because in the early stage of an invention failures were frequent. Comparing the failures of the last three months with those that occurred two years ago, he might state that they were now only 1 per cent., whilst formerly they were as much probably as 50 per cent.

Mr. PHILLIPS understood Mr. Joubert to state that this process could be applied to ceramic bodies. He begged to inquire whether it was equally applicable to china as to glass, and in that case could it be applied to any description of form, as well as to a flat surface?

M. JOUBERT replied that in the specification of his patent he had included ceramic substances as being part of the invention. He had already shown, to a few friends, some successful specimens of the application of this process to china; but he found that one branch of the subject at a time was quite enough to occupy his attention. He had chosen between the two and had worked upon glass in preference; but that being now, as he considered, brought into good working order, his intention was to apply himself now to developing the invention with respect to china, because he was not only convinced that it would answer, but that it was possible to apply it to curved surfaces as well as to flat surfaces.

Mr. GEE inquired whether these subjects were liable to injury from external exposure to the weather or from the ordinary rubbing in the operation of cleaning glass?

M. JOUBERT replied, that the picture, forming an integral portion of the glass itself, could not be injured from the causes mentioned.

Mr. GEE, with reference to the applicability of the process to convex surfaces, inquired whether the subjects were not liable to distortion?

M. JOUBERT, in answer to that, would state, that an

eminent photographer was about to introduce a method of printing photographs upon curved surfaces. He had seen some of those impressions which left no doubt upon his mind that his process would be applicable to all forms of glass or china. The subjects would not be distorted.

Mr. BISHOP remarked, that when he was at Pompeii about two years since, he was shown a piece of plate glass about three-sixteenths of an inch in thickness, which was the earliest specimen of plate glass he had met with.

M. JOUBERT was aware of the fact just mentioned, but there seemed to be some difficulty in establishing the fact that it was really glass. Some learned persons considered it was not glass, but merely a piece of transparent slate or mica that was used in ancient times, which, through the agency of fire, when those cities were invaded by lava, had assumed the appearance of glass. It was a great question whether it was glass.

Mr. BISHOP said that that might have been the case as regarded Herculaneum, which was covered with melted lava, but in the case of Pompeii it was covered with wet cinders and mud, and therefore no vitrification could have taken place. The specimen to which he alluded was about one foot by nine inches; he had carefully examined it, and shou'd pronounce it to be glass, resembling as nearly as possible the material of the present day known as cast plate glass.

M. JOUBERT had not seen the specimen alluded to by Mr. Bishop, and could, therefore, give no decided opinion upon it; he could only judge from the reports he had heard from other persons. A distinguished glass manufacturer (Mr. Chance) read a paper before this Society some years ago, in which he stated that glass had been found in the ruins of Pompeii. Upon reading that, he (M. Joubert) was somewhat startled at the assertion, because he was intimately acquainted with persons who had travelled there, and who had made this subject matter of special investigation, but they had told him it was very doubtful whether it was glass at all. He should not like to decide against the opinion of a gentleman who had seen the thing itself, as his opinion was founded entirely upon the statement of others.

Mr. B. WATERHOUSE HAWKINS said as M. Joubert had submitted to his catechism with so much patience, he begged to trouble him with one more question. As he had included ceramic manufactures in the category of materials susceptible of receiving the benefit of this wonderful invention, he (Mr. Hawkins) would ask whether he had taken into his consideration the possibility of applying this beautiful process to the cheap decoration of ceramic ware, porcelain, and ordinary pottery, so that they might ultimately hope for the banishment of the "willow pattern," and the substitution of varied and more artistic patterns produced by photography, and whether there was a probability of their being so cheaply produced as that they could be multiplied in the same manner, and nearly as cheaply as the present mode of printing upon biscuit.

M. JOUBERT would be glad if he could candidly say that he even saw, looming in the distance, a prospect of applying this process to the displacement of the old willow pattern upon our crockery, but at present he did not think there was much prospect of this, and for this reason:—these pictures were all printed photographically, and every one knew that the process was not very rapid, the operation being liable to be more or less influenced by the state of the weather; but he was quite confident that some day or other the present mode of printing, which was applied to photography generally, would be superseded by the discovery of a mode of producing a perfect metal plate, engraved by means of photography itself. When that was accomplished, no doubt one of its first practical applications would be to the patterns of pottery wares, and they might then have a chance of bidding adieu to the willow pattern for ever.

Mr. Wm. HAWES did not rise for the purpose of putting

more questions to M. Joubert, but if he were inclined to make an observation upon the very able paper they had heard, and the discussion which had followed upon it, it would be to express the great satisfaction they must all have felt at the manner in which the various inquiries had been replied to by M. Joubert. They must have arrived at the conclusion, from what they had heard, that here was a new application of one of the newest and most recent discoveries connected with the art and industry of the present day. Photography, a young art, was applied in a new form, and with great facility, to produce most beautiful effects; and they had been told with a degree of fairness and candour which made them feel satisfied that every word was true, that in the experience of only two years so great a proficiency had been attained, that, whereas the failures were formerly fifty per cent., they were now reduced to not more than one per cent. They had also been told, incidentally in the discussion, that the art of painting upon glass had fallen into neglect for a considerable period in this country, but had again progressed within the last few years. It was about 120 or 130 years ago that the excise was put upon glass. The effect of that interference was to check the application of glass to the most beautiful purposes of domestic life. About 100 years ago the art of painting on glass relapsed, and had only recently revived. It was singular that that should be just about the time when the excise was put upon glass. If that fact was incorrect, his reasoning would fail; but he deduced this conclusion from it—that this was another instance that where there was entire freedom of a manufacture from fiscal imposts, men like M. Joubert could study and experimentalise at comparatively little cost, whereas, if the law put a high duty upon this material, the cost alone would almost have prevented the advancement of such an invention as this. No one could doubt that if M. Joubert could produce designs of this kind, at a cost of 8s. per foot, in the present stage of the invention, in a few years time they would be produced at a price which would bring them into common use. It only wanted more practice, more experience, and manufacture on a larger scale, to reduce the present price of 8s. to almost a nominal sum. The photograph itself was almost costless; the skill was in the transferring of it. This beautiful invention, he had no doubt, would in a short time become an important element in the ornamentation of their houses. With regard to the probability of this invention ever superseding the willow pattern, he believed, in point of economy, that would hardly be achieved, because the printing such designs as the willow-pattern was the cheapest process that could be conceived or introduced. As a member of the Council he begged to express his thanks to M. Joubert for bringing a subject of this kind so ably before them. Generally speaking, he had a strong objection to patentees making use of this Society as a means of disseminating their own views with regard to their own patents. But this was an extraordinary case. Here was not only a patent brought before them, but a beautiful and novel application of art, and it was the duty of this Society, whose main object was to encourage the arts, to give an opportunity of bringing it thus before the public, especially when it was brought forward with such candour as had been shown on the present occasion.

Mr. PHILIP PALMER apologised for his interruption of Mr. Hawes's remarks, with which he agreed, except as to the excise duty upon glass having stopped the art of painting upon glass. M. Joubert had not hinted at such a thing, and he was afraid his friend Mr. Hawes had adopted the popular opinion as to the effect of the repeal of the duty on glass. If the repeal of that duty had done anything, it had had the effect of making the manufacture of glass a monopoly instead of an open trade. At the time the duty on glass was repealed, there were twenty manufacturers; at the present time there were only six. A much larger quantity of glass was produced, but six houses were sufficient to manufacture what was formerly

produced by twenty. The question of the value of glass, in his opinion, had very little to do with the cost of producing these pictures. A piece of glass which now cost sixpence or ninepence, was not worth more than double that sum when the duty was in existence, so that previous to 1845, M. Joubert could have produced his designs at the same cost plus the extra price of the glass at that time compared with the present. He could not consider that the imposition of an excise duty upon glass had had the effect of checking the art of painting on glass, but he rather attributed the disuse spoken of to the want of taste of the period. They knew in what a low state the arts were in this country a century ago, and it was only right to say that this Society was one of the means of keeping alive a taste for art.

M. JOUBERT, in mentioning the average price of 8s. per square foot, wished it to be understood that the remark applied to the smaller specimens on the table. With reference to what had fallen from Mr. Hawes upon the subject of the duty upon glass, he (M. Joubert) would say that he so far concurred in what that gentleman had said, that if glass had been as expensive now as it was before the repeal of the duty, he did not think he should have ventured to engage in this process at all.

Mr. HAWES further remarked that this was not the place to enter upon an argument as to the effects of the repeal of the duty upon glass. There might have been 20 manufacturers before the repeal, and there might be only six now; but if the six could now do that which the 20 did before, the public were no losers by that circumstance. To adopt Mr. Palmer's reasoning was to go back 20 or 30 years in their commercial policy. They had before them the fact just stated by M. Joubert, that if the experiments which had led to the perfection of this process had had to be performed upon an article bearing a high excise duty, the cost of the experiments would have been such as to have deterred him from undertaking them.

The CHAIRMAN said the agreeable duty now devolved upon him of expressing, not only his own views, but he believed the views of the meeting at large, upon the beautiful and novel invention which had been brought before their notice that evening. They sometimes saw decorations of windows which, though beautiful within, had a very unsightly appearance from the outside; but here they had both sides equally beautiful. It was an invention of a peculiar kind. It was pure photography applied to glass, with this addition, that it was burnt into the substance of the glass and became as durable and indestructible as the glass itself; and this he apprehended constituted one of the chief merits of the invention. It would enable them, he trusted, before long, to obtain copies of beautiful pictures for decorative purposes at comparatively small cost. They would not have to form the designs themselves, or to employ expensive artists to execute them; but by the aid of the photographer they might have reproductions of the works of Raphael, or even actual scenes from nature. There was one specimen in particular to which he would call their attention. It was a scene of some Frenchmen reading a proclamation in Paris during the late Italian war. In this way portraits of friends might be employed in the ornamentation of their dwellings. It was the combination of the two great arts of photography and enamelling. It had this superiority over paper photographs; a strong suspicion prevailed that photographs would not last for ever, that the effects produced by the action of light might be destroyed by the light; but by this process the impression was rendered as durable as the glass itself. He was sure the feeling of the meeting would be with him when he expressed the gratification which this novel and interesting application of the photographic art had afforded them. He entertained the highest sense of the value of this paper; but what enhanced its value were the answers given by M. Joubert to the many inquiries which had been put to him. He did not over-answer the questions, but when he dealt with matters which were more subjects of surmise than of actual experience, he replied with a modesty and

talent which carried with it, to his (the Chairman's) mind, a perfect conviction of his sincerity, as well as of his practical ability.

The vote of thanks having been passed,

M. JOUBERT returned thanks for the kind manner in which his paper had been received. He could not allow this meeting to separate without conveying to every person present, as far as he was able to do so, his extreme feeling of gratification for the manner in which he had been received as a stranger in this country, and especially in this Society, since he had had the honour of being a member of it. If bringing this invention before them, which had cost him some labour and anxiety to perfect, had been the means of ministering to their gratification and enjoyment, he felt he was only attempting to repay the debt of gratitude which he owed to the people of this country.

The Paper was illustrated by a great variety of beautiful specimens of the invention.

The Secretary announced that on Wednesday next there would be no meeting of the Society, but that on Wednesday, the 5th of June, at half-past eight o'clock, a Paper, by Mr. Wm. Hawes, "On the International Exhibition of 1862," would be read. On this occasion His Royal Highness the Prince Consort, President of the Society, will take the Chair. *Members only will be admitted to this meeting.*

FEMALE SCHOOL OF ART.

An Exhibition of Water-colour Paintings, from private collections, illustrating the History of the Art; and of Works by Female Students of the Schools of Art, showing the course of instruction, will be opened on Saturday, the 1st of June, at the House of the Society of Arts, John-street, Adelphi, the Council having placed the Society's Great Room at the disposal of the Female School of Art for this purpose.

The admission to the Exhibition will be one shilling, and the proceeds will be appropriated to the fund now raising for a building for the Female School of Art.

The Exhibition will be open daily, from ten a.m. to six p.m., and will close on Saturday, the 15th June.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The thirty-first meeting will be held in Manchester, September 4th, 1861, under the presidency of William Fairbairn, Esq., LL.D., F.R.S.

The Local Sub-Committee of section A (Mathematics and Physical Science) for the ensuing meeting of the British Association at Manchester, considering that an Exhibition of Telegraphic Machinery, illustrating its gradual development, would prove at once interesting and instructive, has determined, if possible, to arrange such an Exhibition. With this view the Committee are seeking, from those connected with this subject, contributions of instruments, batteries, or specimens of insulation, &c., showing the history, progressive improvements, and present condition of telegraphy. Persons willing to assist the Committee are requested, at their earliest convenience, to forward a statement of what instruments or specimens they would be disposed to contribute.

It is proposed to illustrate the practical working of the various instruments by opening communications on one evening to the principal cities of this country and the Continent—say to London, Aberdeen, Dublin, Cork, Berlin, Vienna, &c.; and the Committee will be glad to know upon whom they may depend for aid in establishing these communications, and to what places it may be

desired to work through special wires to be extended to the Free Trade Hall, and what amount of accommodation will be likely to be required in the building.

Portraits of men eminent in the science of telegraphy, photographs of telegraphic works, or apparatus—in short, anything calculated to increase the interest of the Exhibition, will be gladly received by the Committee.

Communications should be addressed to R. B. Clifton and Thomas Heelis, the Hon. Secretaries of the Section.

ARTISTIC CONGRESS AT ANTWERP.

An Artistic Congress will be held at Antwerp, on the 19th and 20th August next, in the Council-room of the Cercle Artistique Littéraire et Scientifique, to which Artists and Literary Men of All Nations are invited, under the Presidency of M. J. F. Loos, President of the Cercle, Burgomaster of Antwerp and Member of the Belgian Chambers.

The following is the programme of the proceedings:—

QUESTIONS OF MATERIAL INTERESTS.

The establishment of an International Legislation for the Full Suppression of the piracy of Works of Art.

1. The Artist who has created a Work of Art, has he alone the right to authorise its reproduction, whether by means similar to those which he has employed, or different from them?

2. What means shall be employed in order to protect an Artist against the fraudulent imitations of his Works?

3. What measures shall be taken against the placing of a false signature upon Works of Art?

4. Shall the repressive laws concerning the violations of Artistic property, be applicable to Art when applied to Manufactures?

5. By what means can a good understanding be established between Governments in order to the general recognition of Artistic property?

QUESTIONS OF ARTISTIC INTERESTS.

1. Is the expression of Monumental Art in harmony with the manifestations of modern ideas?

2. Is not the union of Architecture, Sculpture, and Painting indispensable to Monumental Art? What reforms should be introduced into the mode of instruction in the Fine Arts, in order to establish that union?

3. Is it not in the union of Architecture, Painting, and Sculpture, that Monumental Art should find the elements of a new style, which ought to characterise our epoch?

QUESTIONS OF PHILOSOPHICAL INTERESTS.

1. What affinity exists between Philosophy and Art?

2. Does not Art exert a certain influence upon the intellectual and moral development of nations?

3. What influence can be attributed to modern ideas upon contemporary art? Does our epoch possess any new principle which may give to the Fine Arts a new expression and direction?

4. If Art, expressing contemporary ideas, must contain their symbol, what kind of Works will best reach that end?

All communications in reference to the Congress should be addressed to the Committee of Organisation, as above.

Home Correspondence.

MR. MACGREGOR'S PAPER ON THE HYTHE SCHOOL OF MUSKETRY.

Sir,—The very able paper read by Captain MacGregor, on the 15th inst., "On the Hythe School of Musketry Instruction in Rifle Shooting," was so complete an exposition of the system practised at that very efficient establishment, that little could be said in the way of discussion; and Lord Elcho, who so ably presided on the occasion,

limited the discussion so closely to the subject of the paper, that, although I attended with the view of making a few remarks upon a subject intimately connected with the present crisis, and more particularly with the Volunteer Rifle movement, I did not consider that I ought, under the circumstances, to obtrude my remarks upon the meeting.

The great improvements which have been made during the last few years in the construction and use of common and small arms, by Sir William Armstrong, Whitworth, and others, will most unquestionably revolutionise both the science and the practice of war. War will henceforward become "fast and furious," hot and short-lived, or it will become more cautious, more scientific, and more a war of position than formerly. Temporary field-works will consequently be more extensively employed, so that a navvy's spade, if judiciously directed and well handled, will become at least equal to two rifles. This circumstance will add much more to the defensive powers of England than it will tend to the advantage of her invaders.

The increased range—the increased penetration—and the marvellously increased precision of the Armstrong cannon—and the destructive nature of his projectiles, renders the existing type of fortification almost useless, and it is questionable whether it is not a waste of public money to expend it in rearing masses of brickwork, which can be so easily disposed of by the new weapons of destruction.

Some ten or twelve years ago, when there were apprehensions of an invasion, I proposed to a high military authority that the whole of the English coast (the southern coast in particular) and the several routes which an invading army would take, from the point of debarkation, in marching upon London, should be carefully reconnoitred, and works designed of a nature adapted to the several defensive positions thus selected, where a temporary resistance would be offered to impede the advance of an invader, or where a more determined stand would be made. These selected positions to be marked on the Ordnance one inch map, and numbered, the numbers having reference to more detailed plans of works suitable to the several defensive positions.

These works were proposed to be of a temporary nature, such as could in most cases be thrown up in a few hours, and in all cases in a few days, provided the proposed previous arrangements had been carried out to such an extent as to prevent delay or confusion when the threatened alarm was given.

The works thus proposed to be selected, and their position marked on an ordnance plan, would principally consist of intrenchments upon the crests of the chalk-ridges, scarping the more precipitous portions of these ridges; lines of abattis, in favourable positions, where materials could be readily obtained; and a variety of other contrivances, which would render one man equal to ten men.

The siege of Sebastopol has given an increased prestige to earth works, as compared to works composed of masses of masonry.

Temporary field-works would also be extremely useful, indeed essentially necessary, to give confidence to troops who have not had sufficient experience to act in considerable numbers. Some protection of this kind would be indispensably necessary, in order to give to the Volunteers that confidence which the regular army derive from the promptitude and steadiness with which they act in considerable bodies, and the support which every portion of an army in the presence of an enemy expects to receive from every other portion, in the event of being out-flanked or overwhelmed by numbers.

Suppose, by way of illustration, that an intrenchment, affording ample protection, and a rest for the rifle, is thrown up on the crest of a ridge, and occupied by 1,000 Volunteers, and that a body of 5,000 men is seen advancing at a distance of 1,000 yards. The first-class shots (say 50 out of the 1,000) would commence firing at that distance, and by being supplied with rifles ready loaded, and firing from a rest, would be able to make a favourable

impression, at all events to amuse the enemy until he arrived within the effective range of the second-class marksmen, and so of the third-class, until about the range of 400 yards the whole would open a steady, well-sustained fire, and there can be no doubt but that the intrenched 1,000 Volunteers would be able, in close combat, to give a very good account of the fragment of the foe who would arrive at the intrenchment. And if an abattis, or any obstruction which would cause a delay of three or four minutes within 100 yards' range of the intrenchment were constructed, even that fragment would be disposed of.

Every Volunteer officer, and those of the non-commissioned officers and men who can afford the time, should make themselves acquainted, at all events theoretically, with the general principles of field fortifications. This might be done, to a considerable extent, by lectures, well illustrated by diagrams and models.

There is one mysterious department of the Government which ought to be especially looked up at the present crisis—that is, the Survey Department.

The National Surveys were commenced, about eighty years ago, with the view, principally, of producing a military map of the country, and it may be doubted whether there is any efficient military map of the country in existence at the present moment; and without a good map it is impossible to ascertain the defensive positions to advantage. The six-inch skeleton map of London has had the hill-shading added to it, and if published would be so far a useful map, but from some mysterious cause it is not on sale. What the authorities are doing with reference to the formation of a military map of the country, and why the hill-shaded map of London, already completed, is not on sale, are questions which should be put to the House of Commons by some independent member, and which should be answered for the satisfaction of the country.

I am, &c.,
ALEXANDER DOULL.

MEETINGS FOR THE ENSUING WEEK.

MON. ...Geographical, 1. Anniversary.

British Architects, 8.

TUES. ...Royal Inst., 3. Mr. John Hullah, "On the History of Modern Music."

Civil Engineers, 8. Continued discussion on the "National Defences."

Medical and Chirurg., 8½.

Zoological, 9.

WED. ...Royal Soc. Literature, 4½.

THURS. ...Royal Inst., 3. Mr. Prangelly, "On the Devonian Age of the World."

Royal, 8½.

Antiquaries, 8½.

FRI. ...United Service Inst., 3. Captain C. P. Coles, "The Great Revolution which must ensue in our National Defences in consequence of the introduction of Iron-cased Ships."

Royal Inst., 8. Dr. W. V. Waller, "On the Nutrition and Preparation of Nerve."

SAT. ...Actuaries, 3. Anniversary.

Royal Inst., 3. Prof. Max Muller, "On the Science of Language."

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, May 11th, 1861.]

Dated 11th January, 1861.

78. M. C. E. Page, Valdois, near Belfort, France—An improved kneading machine.

Dated 18th February, 1861.

400. E. F. Barnes, New York—Imp. in instruments, or a combination of conductors and attachments for transmitting and recording messages, in any form of letter or character, by means of electricity or electro-magnetism, acting either mechanically or chemically, and which invention may also be applied to the transmitting or copying figures as maps of any form of outline.

Dated 24th April, 1861.

872. J. Higgins and S. Whitworth, Salford, Lancashire—Imp. in machinery or apparatus for preparing cotton and other fibrous materials for spinning.

Dated 13th April, 1861.

910. A. F. Delanoy, Paris—Imp. in boxes and bearings for lubricating the axles and journals of wheels, also applicable to lubricating the shafts or axles of machinery in general.

Dated 19th April, 1861.

962. P. Mingaud, 42, Rue Laffitte, Paris—Imp. in obtaining jellies, syrups, and drinks, from the tree Arbutus Unedo or Arbetier.

964. I. Riley and T. C. Wolstenholme, Blackburn—Imp. in heating apparatus for domestic and other purposes.

975. J. Gjers, Middlesbrough-on-Tees, Yorkshire—Imp. in the construction of machinery or apparatus for obtaining motive power.

Dated 23rd April, 1861.

1004. T. Peters, Great Alle-street, Whitechapel—Imp. in machinery or apparatus for moving, conveying, transporting, or transmitting bodies.

Dated 24th April, 1861.

1020. G. D. Davis, 3, Bromley-terrace, Saint Leonard's-road, Middlesex, and J. Davis, 20, Archer-terrace, East India-road—Imp. in machinery for raising anchors, stopping cables, preventing cables from riding, and other like purposes.

1022. J. Rhodes, Morley, near Leeds, and R. Kemp, Leeds, Yorkshire—Imp. in rag machines.

Dated 25th April, 1861.

1030. T. Taylor, 7, Wellington-row, Bethnal-green, Middlesex—Imp. in machinery for cutting certain fabrics into strips.

1040. E. Strange, Waterford, Ireland—An improved method of, and apparatus for, intercepting and carrying off the sewage of large towns, and preventing the defilement of rivers thereby.

Dated 30th April, 1861.

1077. H. J. T. Labat, Bordeaux, France—An improved apparatus for hauling ashore ships and vessels of all sizes and descriptions.

1079. J. Meyer, Manchester—Certain new chemical combinations, and for the application thereof to fixing aniline and pigment colours in printing and dyeing to tanning, waterproofing, and other industrial purposes. (A com.)

Dated 1st May, 1861.

1081. W. Horn, 3, Butler's-terrace, Ossory-road, Old Kent-road—Imp. in steam and water tight joints for fixing tubes in plates, such as are used for surface condensers, distillers, refrigerators, vessels for heating feed water or tubular boilers. (A com.)

1085. F. J. Bramwell, 354, Great George-street, Westminster, and W. Owen, Phoenix Iron Works, Rotherham—Imp. in the manufacture of rails, bars, plates, cylinders, vessels, axle-trees, cranks, wheel tyres, and other articles of wrought iron or steel, and also in the machinery used in such manufactures.

1087. F. Z. Monsein, 29, Boulevard St. Martin, Paris—Colouring matters derived from naphthalamine, cinniro-naphthamine, and trinitronaphthalina, and application of such coloring matters to the dyeing and printing of fabrics.

1088. W. Browning, St. John-street, West Smithfield, Middlesex—A new method and apparatus for ascertaining the distance of distant object.

1089. T. Hooman and J. Maliszewski, 490, New Oxford-street—Imp. in photographic printing upon the interior of any glass or other transparent vessel.

1090. J. E. F. Ludeke, Marke, Hanover—Imp. in motive power engines.

1091. A. McNeile, Liverpool—Imp. in the construction of targets.

1093. W. Walton, Ivy-cottage, Old Charlton, Kent—A new manufacture of overlapping wall facing.

PATENTS SEALED.

[From Gazette, May 17th, 1861.]

May 17th.

2837. O. Vandeneil.	2873. J. Anderson.
2841. T. T. Macneill.	2881. A. A. Dalgleish.
2847. J. Marland.	2884. C. R. N. Palmer.
2854. J. Howden.	2891. W. Leigh.
2870. W. Manwaring.	289. J. Abraham.
	593 J. Jacob.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[From Gazette, May 17th, 1861.]

May 13th.

1079. A. M. Dix.	May 14th.
1090. J. Macintosh.	1115. J. Bottomley and A. H. Martin.

May 16th.

1101. H. Curzon, jun.	1135. J. Apperly & W. Clissold
1166. C. F. D. Monnin.	1174. F. A. Gatty.

May 17th.

1082. J. H. Johnson.	May 18th.
1122. J. Hesford.	1159. W. Harding.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[From Gazette, May 21st, 1861.]

May 18th.

1120. R. Crosland, W. Holiday, and J. Heaton.	1169. G. Alton and J. Firnie.
	1194. G. H. Bowill.